right angles to the nucleus. The concentric layers often exhibit an irregularity which the Author maintains to be incompatible with their chemical origin. Again, granules are found, made of calcium carbonate occurring in two forms—a clear crystalline portion representing the organic structural part, and an amorphous portion consisting of ordinary carbonate of lime, which is either infilling or secreted material, possibly both.

In discussing the origin of the crusts around the nuclei the Author treats of the radial structure which is so marked a feature in the crust of oolitic granules. This structure has the appearance of light and dark striæ when seen by reflected light: the light are tubules which have grown at right angles to the nucleus, while the dark are secondary formations.

He refers to Rothpletz's description of the oolitic granules of the Great Salt Lake, which are stated to have originated from the growth of lime-secreting algæ, and thinks it possible that the fossil forms are of like origin, though not necessarily due to organisms allied to algæ, and possibly even lower in the scale of life; *Girvanella* was the first type of oolite-forming organism discovered, and it is simply a tubule.

February 6, 1895.—Dr. Henry Woodward, F.R.S., President, in the Chair.

The following communication was read:—

'On Bones of a Sauropodous Dinosaur from Madagascar.' By R. Lydekker, Esq., B.A., F.R.S., V.P.G.S.

The bones described in the paper were collected by Mr. Last to the east of the town of Narunda, on the north-eastern coast of Madagascar. They include vertebræ, limb-bones, and portions of pectoral and pelvic girdles. These bones are described in detail, and the animal which possessed them is referred to the genus *Bothriospondylus*, Owen: a dorsal vertebra, described in the paper, being taken as the type of the new species.

The identification of the Malagasy reptile with a type occurring in the Jurassic rocks of England harmonizes with the reference of some of the strata of the island to the Jurassic period.

MISCELLANEOUS.

On the Cephalic Lobe of Euphrosine *. By Émile-G. Racovitza.

The cephalic lobe of the Amphinomidæ, in its most complicated condition, is provided with the following organs: an unpaired antenna, inserted near the posterior border, and two pairs of eyes, one of which is situated in front of, and the other behind, the base of this appendage. A pair of antennæ is situated in front of the anterior pair of eyes. On the ventral side, in front of the mouth,

* The investigations were conducted at the Arago Laboratory (Banyuls-sur-Mer).

are found the two lips, while on the dorsal surface, behind the unpaired antenna, is situated the caruncle. The *external antennæ* (*auctorum*) are tentacular cirri by reason of their innervation, and Quatrefages (1865) justly contends that they must belong to a rudimentary segment.

On studying certain series of forms belonging to the family with which we are dealing, two tendencies may be remarked in the modification of the anterior extremity: (1) The parapodia of the first three or four segments travel more and more towards the front, so that their axes tend to lie in the sagittal plane of the body; (2) the mouth and lips travel more and more towards the rear, and the anterior pair of eyes, with the paired antennæ, tends to pass to the ventral surface. It is probable that the second tendency is but a result of the first.

These modifications are exhibited to a very high degree in *Euphrosine*. In this genus the caruncle, the unpaired antenna, and the posterior eyes have retained their dorsal position (they have even been thrust slightly backwards), but the anterior eyes and the paired antennæ are ventral. Between the paired antennæ and the unpaired organ lies a considerable space, occupied by the terminal projection of the anterior extremity, which corresponds to the very small interval that separates the appendages in question in the case of the other Amphinomidæ. Since in *Euphrosine* the first segment is normal, the tentacular cirri appear in their primitive guise of parapodial cirri.

The study of the brain not only justifies the interpretation given to the cephalic lobe of *Euphrosine*, but permits us at the same time to comprehend the true nature of the appendages. I agree with Hatschek (1893) in considering that the brain of the Polychætes provided with cephalic appendages is formed of three distinct regions: the anterior brain innervating the palpi; the middle brain giving off nerves to the antennæ, to the eyes, and furnishing the major portion of the fibres of the commissures; and finally the posterior brain which innervates the nuchal organ.

In *Euphrosine* the brain undergoes the same change of position as the cephalic lobe. The anterior brain is ventral; it gives off two large nerves, which pass each to the corresponding lip. These organs, formed by evaginations of the dermo-muscular layer, are therefore palpi. They cannot be homologous with the buccal pads (caussinets buccaux) of the Eunicidæ, as is supposed by Ehlers (1887), but are homologous with the palpi of those animals, as also of the Aphroditidæ.

The middle brain exhibits great elongation and great lateral compression. Its median region, from being dorsal, has become anterior. From its anterior region, which has become ventral, issue the commissures which run their entire course in a plane that is horizontal, and not more or less vertical as in the case of the other Polychætes. From the same region arise the nerves of the anterior eyes and those of the paired antennæ. The nerve of the unpaired antenna and those of the posterior eyes are furnished by the posterior region, which is here dorsal, of the middle brain.

The posterior brain, which, in this form, is distinctly dorsal, is very strongly developed; it gives off two large nerves which pass into the caruncle. The latter organ, which was misinterpreted by Ehlers (1864), has recently been described by McIntosh (1894), who, however, did not recognize its true nature and saw in it nothing but some fibres. Its innervation, however, shows that the caruncle is nothing else than the *nuchal organ*. It is formed, in fact, by three elongated folds of the body-wall. One of these folds is of greater length, and is placed between the other two; its lower edges are united to the inner edges of the lateral folds. Vibratile furrows, which are very distinct and parallel, run the entire length of the folds. There are four of them on the median fold, and only two on the lateral ones. Two of the vibratile furrows pass from the caruncle on to the cephalic lobe, and extend as far as the paired antennæ. I shall describe this arrangement in detail elsewhere. I am likewise unable to dwell here upon the histological structure of the caruncle, which, moreover, does not differ essentially from that of the same organs in other Polychætes. The three folds indicated above are entirely similar to the occipital lappets (ailerons occipitaux) of e. g. *Amblyosillis*. Their union into a single mass only disguises the primitive condition which is still represented in *Euphrosine triloba*, Ehlers.

The glandular organs which, according to McIntosh (1894), are found on each side of the caruncle, are nothing but masses of pigment deposited in the posterior lobes of the brain. Similar masses are also found along the pedal nerves, and also in other Polychætes (*e. g.* ventral chain of *Eunice*). Veritable glandular organs, however, exist. These are two pyriform masses, constituted by greatly elongated hypodermic gland-cells. These organs belong to the palpi; for if the bodies of the cells are situated behind the brain, their ducts open on the surface of the palpi.

In the genus *Spinther* the tendencies indicated at the commencement of this note have been realized much more completely. The parapodia of the first segment have become united in front of the cephalic lobe. The caruncle has disappeared equally with the palpi and the paired antennæ. The unpaired antenna of the Amphinomidæ alone persists, with its four eyes at its base.

The presence of four of these organs upon the dorsal face and at the base of the unpaired antenna clearly indicates that *Spinther* cannot be the direct descendant of *Euphrosine*. These two genera form two distinct branches from the stem of the Amphinomidæ. The tendency towards radial symmetry which is displayed in *Spinther* as in *Euphrosine* must not be attributed to a direct parental connexion between the two forms. The explanation of the phenomenon is to be sought in a convergent evolution occasioned by a mode of life almost as sedentary as that of fixed animals.—*Comptes Rendus*, t. cxix. no. 26 (December 24, 1894), pp. 1226–1228.

On the Development of the Kidney and of the Cœlome in Cirripedes.

By A. Gruvel.

In the paper which I have published in the 'Archives de Zoologie